

Buoyancy Estimates of Malaysia's Tax System 1961 - 1998

JEYAPALAN KASIPILLAI
MUSZAFARSHAH MOHD. MUSTAFA
*School of Accountancy
Universiti Utara Malaysia*

ABSTRACT

Several criteria are used to determine a 'good tax system' and they include administrative feasibility, ensuring burden of tax is spread fairly among taxpayers and tax buoyancy. Tax buoyancy measures the responsiveness of tax revenue to income growth. Previous studies have assumed a constant buoyancy estimate for the period under study and hence applied a double-log tax model (Mansfield, 1972; Choudhry, 1975; Byrne, 1983). In practice, however, tax buoyancies may change over time due to inflation, changing tax bases, improved tax administration and stricter enforcement of tax law by revenue authorities.

This study uses the Box-Cox tax model which allows the determination of inter-temporal tax buoyancies for the period 1961-1998. The results obtained revealed a steady decline in buoyancy estimates of less than one for both direct and indirect taxes implying inefficiencies in the tax system. Suggestions are made to revamp the current tax system by integrating existing indirect taxes such as sales and service tax into a single broad-based consumption tax.

ABSTRAK

Kriteria yang digunakan dalam menentukan 'sistem cukai yang baik' termasuk keanjalan pentadbiran, memastikan beban cukai diagihkan secara adil di kalangan pembayar cukai dan keapungan cukai (tax buoyancy). Keapungan cukai mengukur kesan hasil pencukaaian ke atas pertumbuhan pendapatan. Kajian lalu mengandaikan anggaran keapungan adalah pada tahap malar bagi tempoh yang dikaji dan mengaplikasikan model 'double tax-log' (Mansfield, 1972; Choudhry, 1975; Byrne, 1983). Namun, secara praktis, keapungan cukai mungkin berubah dari semasa ke semasa disebabkan tahap inflasi, perubahan dalam asas pencukaaian kemajuan dalam pentadbiran cukai dan ketegasan pihak berkuasa pencukaaian dalam menguatkuasakan undang-undang pencukaaian.

Kajian ini menggunakan model cukai 'Box-Cox' yang membolehkan penentuan keapungan cukai secara inter-temporal bagi tempoh 1961-1998. Hasil kajian mendapati penurunan tetap dalam anggaran keapungan yang kurang daripada satu bagi kedua-dua cukai langsung dan tidak langsung menggambarkan ketidakcekapan dalam sistem pencukaaian. Cadangan mengintegrasikan cukai tidak langsung seperti cukai jualan dan perkhidmatan kepada satu cukai berasaskan penggunaan yang lebih luas dikemukakan bagi merombak sistem pencukaaian semasa.

INTRODUCTION

Every country uses taxation as a tool to achieve primary objectives such as economic growth, income distribution, economic stabilization and revenue generation. As for Malaysia, until the mid-sixties, the main objective of the country's tax policy was to raise revenue for the government. Only later on, however, the tax system was rationalized to achieve other socially desirable objectives besides generating revenue.¹

Revenue for the Malaysian federal government is derived from two sources: tax revenue and non-tax revenue. Tax revenue consists of duties and taxes imposed by law and may be further grouped into two: direct tax revenue and indirect tax revenue. Direct tax revenue includes income tax, petroleum income tax, stamp duty and real property gains tax. Indirect tax revenue consists of export duties, import duties, excise duties, sales tax, service tax and other miscellaneous taxes.² Non-tax revenue mainly comprises investment income, petroleum royalties and gas payments, licenses, permits and registration fees, and fines and forfeitures.

TRENDS IN MALAYSIA TAX REVENUE

Malaysia, in common with most developing countries, relied heavily on indirect taxes during the early stages of its development (Musgrave, 1987). For example, in 1960 indirect taxes accounted for 78.9 percent of total tax revenue, with export and import duties (including temporary surcharge and surtax) making up by far the major part of taxes. As the economy developed, and with the introduction and expanded range of other taxes, less reliance was placed on indirect taxes, which by 1997 generated less than half (43.3 percent) of tax revenue. Correspondingly, the importance of direct taxes increased. In 1960, direct taxes contributed only 21.1 percent of revenue (Table 1). The share reached 51.3 percent in 1990 and remained around that level for several years. In 1998, the share of direct taxes to federal tax revenue stood at 51.6 percent compared to 56.7 percent in the previous year (Economic Report, 1998/99). Although the 1998 figures are revised estimates, these data provide reliable information. The overall shift in emphasis towards direct taxes rather than indirect taxes was a reflection of the changing eco-

Table 1
Direct Taxes as a Percentage of Federal Tax Revenue

| Year | Corporate Tax | Personal Income Tax | Petroleum Income Tax | Other Direct Taxes | Total Direct Taxes |
|------|---------------|---------------------|----------------------|--------------------|--------------------|
| 1960 | 15.8 | 5.3 | - | - | 21.1 |
| 1970 | 24.5 | 8.4 | - | 2.1 | 35.0 |
| 1980 | 19.8 | 7.6 | 13.5 | 3.4 | 44.3 |
| 1985 | 20.2 | 9.8 | 17.7 | 3.9 | 51.6 |
| 1990 | 19.3 | 13.2 | 15.8 | 3.0 | 51.3 |
| 1995 | 28.1 | 14.9 | 5.2 | 6.2 | 54.4 |
| 1996 | 30.0 | 13.1 | 4.7 | 7.0 | 54.8 |
| 1997 | 31.1 | 12.0 | 7.2 | 6.4 | 56.7 |
| 1998 | 29.8 | 11.3 | 7.5 | 3.0 | 51.6 |

Source: *Economic Reports of Malaysia*, Various Issues

conomic structure and the rising importance of personal income tax as a source of tax revenue.

Indeed, income tax was one of the surest ways by which the Treasury could obtain a steady source of revenue and from which the government could budget its annual expenditure because of fluctuating export prices in primary commodities. In 1995, personal income tax accounted for 14.9 percent of the total tax revenue. This proportion of personal income tax to Federal tax revenue was maintained around 11 to 13 percent between the years 1996 to 1998.

SOURCES OF REVENUE: A BREAKDOWN

- *Direct Taxes*

Tax revenue will undoubtedly continue to be the main source of income for the government of Malaysia as the country experiences economic growth. In 1997, 46.3 percent of the federal government revenue was from direct taxes and the remainder was from indirect taxes (35.3 percent) and non-tax revenues (18.4 percent). The federal government revenue in 1998 was

adversely affected by unfavourable economic performance. Total revenue collection declined approximately by 16 percent to RM55,050 million. Direct taxes collected in 1998 amounted to RM29.7 billion compared to RM30.5 billion in 1997, a decrease of 2.6 percent (Table 2).

- *Indirect Taxes*

Developing countries also rely heavily on indirect taxes for convenient tax revenue generation in the early stages of their tax system. This trend applied too in the case of Malaysia. For instance, indirect taxes accounted for 78.4 percent of the total Federal Tax Revenue in 1960 (Table 3).

The fast expansion in indirect taxes was primarily due to the significant role played by traditional taxes such as Import Surtax and Rubber Export Surcharge introduced at that time. The relative importance of indirect taxes has steadily declined over the years. For example, from 72.9 percent in 1965 to 65 percent in 1970 and to a low of 48.4 percent in 1985. In 1998, the proportion of indirect tax to Federal Tax Revenue stood at 35.5 percent.

Table 2
Trend in Revenue Collection from Direct Taxes (1992-1998)

| Year | Billion (Ringgit) | |
|------|-------------------|-------|
| | Nominal | Real* |
| 1992 | 15.4 | 14.2 |
| 1993 | 17.1 | 15.2 |
| 1994 | 20.2 | 17.0 |
| 1995 | 22.7 | 18.2 |
| 1996 | 25.8 | 19.7 |
| 1997 | 30.5 | 22.7 |
| 1998 | 29.7 | 20.7 |

Source: Various Economic Reports

*Using GDP deflator (100=1990)

Table 3
Indirect Taxes as Percentage of Federal Tax Revenue

| Year | Export Duties | Import Duties & Surtax | Excise Tax | Sales Tax | Other Indirect Taxes | Total Indirect Taxes |
|------|---------------|------------------------|------------|-----------|----------------------|----------------------|
| 1960 | 29.2 | 40.0 | 0.9 | - | 6.4 | 78.4 |
| 1965 | 19.9 | 40.1 | 0.8 | - | 2.1 | 72.9 |
| 1970 | 14.0 | 27.9 | 12.5 | - | 0.6 | 65.0 |
| 1975 | 13.7 | 17.5 | 9.3 | 5.9 | 9.4 | 55.8 |
| 1980 | 20.2 | 15.9 | 7.6 | 5.4 | 6.6 | 55.7 |
| 1985 | 10.0 | 14.9 | 8.3 | 7.4 | 7.8 | 48.4 |
| 1990 | 9.3 | 16.1 | 10.7 | 11.5 | 3.4 | 51.0 |
| 1991 | 8.3 | 16.2 | 11.1 | 9.8 | 3.3 | 48.7 |
| 1992 | 8.8 | 13.4 | 11.7 | 11.6 | 4.0 | 49.5 |
| 1993 | 4.6 | 14.3 | 11.6 | 10.9 | 5.1 | 46.5 |
| 1994 | 3.1 | 14.9 | 11.5 | 11.0 | 5.7 | 46.2 |
| 1995 | 2.0 | 13.5 | 12.7 | 11.7 | 5.6 | 45.5 |
| 1996 | 2.2 | 13.0 | 12.2 | 11.6 | 6.3 | 45.3 |
| 1997 | 2.0 | 12.2 | 11.3 | 11.5 | 6.3 | 43.3 |
| 1998 | 1.5 | 9.4 | 7.3 | 8.8 | 8.5 | 35.5 |

Source: *Economic Reports of Malaysia*, Various Issues

IMPLEMENTATION OF TAX LAWS

• *Direct Taxes*

The Inland Revenue Board is responsible for all policies relating to direct taxes, viz.: Income Tax, Petroleum Income Tax, Real Property Gains Tax and Stamp Duty. The responsibility for the administration of direct taxes is with the Director General of the Inland Revenue Board. The operations of the IRB are highly decentralized. The Director General exercises her advisory and supervisory function from the Head Office located in the Federal Territory. Currently, there are 27 branches in West Malaysia and another nine branches in East Malaysia. The branch offices are responsible for enforcing the ITA by tracing new taxpayers, issuing and obtaining annual returns, computing taxes payable, and issuing notices of assessments. Most branches have an investigation and intelligence unit and they are staffed by at least six to

25 senior officials, depending on the size of branches and the concentration or density of taxpayers. Currently, there are 13 investigation units in West Malaysia and one each in Sabah and Sarawak.

Under the ITA, every person who is liable to income tax is required to file a return of his or her income with the IRB. It is this filing requirement that sets the administrative machinery into motion.

• *Indirect Taxes*

The responsibility to administer indirect taxation in Malaysia lies with the Director General of the Royal Customs and Excise Department. The various types of indirect taxes include customs duties, excise duty, sales tax and service tax. Other miscellaneous indirect taxes include levy on goods vehicles leaving the country.

In a move to gain more revenue from indirect taxes as opposed to direct taxes, the government has, over the years, been increasing the base of sales tax as

well as service tax. Furthermore, the broadening of the scope of service tax over the years can be seen as preparing the eventual introduction of a broad based consumption tax, referred to as Sales and Service Tax (SST). In Australia, New Zealand and Singapore, the value added consumption tax is referred to as Goods and Service Tax (GST) while in Europe it is termed as value added tax.

TAX BUOYANCY AND ELASTICITY

According to James and Noble (1996), there are well established criteria which a good tax system might be expected to meet. For instance, a tax system should be efficient in that it does not generally distort economic decision-making and its administrative and overall compliance costs should not be excessive. One other criteria used to measure a 'good' tax system is tax buoyancy. According to Asher (1989), a tax system is regarded as 'good' if it is buoyant in nature.

The buoyancy of a tax system measures the total response of tax revenue to changes in national income or gross domestic product (GDP). A tax system is said to be buoyant if a one percent increase in GDP raises tax revenue by more than one percent. If the tax revenue raised is less than one percent, the tax system is said to be less buoyant. A high tax buoyancy is said to be a desirable attribute since a rise in GDP would generate more tax revenue while a less buoyant tax system would generate lower tax revenue.

Other than buoyancy, one other measure of revenue productivity is income elasticity. The income elasticity of a tax system is the built-in responsiveness of its revenue yield to movements in national income or gross domestic product (GDP), excluding the effect of discretionary changes in tax legislation over the period. Tax buoyancy, however, includes these discretionary effects.

Previous buoyancy studies of Malaysia's tax system had shown declining buoyancy values over the years. Asher (1989) estimated the buoyancies of total

tax revenue for the period 1966-1977 and 1978-1987 to be 1.484 and 0.732 respectively. A similar study by Ismail (1988) for the period of 1971-1977 and 1978-1984, found the buoyancy of indirect taxes to be 1.14 and 0.93 respectively while that of direct taxes to be 1.54 and 1.38 respectively. Bardai (1993) also found a declining trend in indirect taxes' buoyancy estimates when he compared values between two periods: 1966-1976 and 1977-1987. For the former, the buoyancy was estimated to be 1.14 while for the latter it was 0.93.

In the 1992/93 Economic Report, it was noted that the tax revenue buoyancy estimates had fallen significantly from 1.25 between 1971-80 to 0.55 between 1980-90. The buoyancy for direct taxes fell from 1.4 in the 1970's to 0.57 in the 1980's whilst that for indirect taxes too fell from 1.16 in the 1970's to 0.47 in the 1980's; signaling the inability of direct and indirect tax receipts to keep up with increases in GDP. This has prompted many tax scholars to suggest a total revamp of our tax system by introducing a consumption-based tax such as Value Added Tax (VAT) in addition to existing indirect taxes. These suggestions were duly noted by the Minister of Finance in his 1989 budget speech when he remarked the following :

"The reduction in direct taxes I am proposing will lead to substantial losses in revenue, and with the increases in expenditure, there is no other alternative but to strengthen our sources of revenue. In this context, the sales tax in its existing form is limited in scope and has a number of inherent weaknesses... To overcome these, there is merit in considering a Value Added Tax (VAT), which is a broad-based and equitable tax...."

Although suggestions to introduce a value-added form of tax was indicated a decade ago, such a tax has yet to be introduced in Malaysia.

This paper attempts to estimate the buoyancies of Malaysia's direct and indirect taxes for the period of 1961-1998. In doing so, an attempt is made by the authors to employ the Box-Cox (1964) method which would determine the intertemporal tax buoyancies of Malaysia's tax system. The year 1999 was excluded as in that year there was a structural change in the Government's fiscal approach to boost economic recovery after the 1997 East Asian financial crisis. The Box-Cox method is discussed below after reviewing studies on constant-buoyancy tax model by several researchers.

THEORETICAL UNDERPINNINGS

Many of the studies done on tax buoyancy assumed its value to be constant over the period under study and thus applied the constant-buoyancy tax model.³ Mansfield (1972), Choudhry (1975), Byrne (1983) and Ismail (1988), among others, assumed a constant buoyancy or elasticity for the period under study. The main reason given by Mansfield (1972) for this assumption was that the period reviewed can be considered 'short-run' and thus the buoyancy would remain constant.

Although the constant-buoyancy assumption made by earlier researchers seems to be reasonable, there are reasons to doubt that this assumption might be valid for the developing countries even in the short-run. In fact, the results obtained by some researchers seem to indicate that buoyancy might not be constant over a period of time since the segmented buoyancies were not the same.

By definition, tax buoyancy is the ratio of the marginal tax rate to the average tax rate; (MTR/ATR).⁴ Changes in this ratio over time would also alter the tax buoyancy estimates. In a progressive tax system where the tax brackets are not indexed to inflation, an increase in nominal income would not necessarily imply an increase in the purchasing power, due to increase in prices. During inflation, people demand higher nominal income to off-set increasing costs of living.

But in a tax system that is not indexed, a higher nominal income would push taxpayers into higher tax brackets and thus alter the tax buoyancy.

Tax buoyancy may also vary over time due to the tax base effect. This is because, in a developing country, as the economy grows, more people and companies will be deriving higher income and would therefore be liable to pay income taxes. Over time, as more people and companies become wealthier, the tax bases tend to grow faster than GDP, resulting in increasing tax buoyancy estimates over time.

Finally, as a developing country industrializes over time, the government tends to improve the tax system by providing better administrative services and greater enforcement of tax law resulting in higher tax collections. A rise in tax collections would alter the tax buoyancy estimates. Any further alterations in tax policy, such as changes in tax rates and brackets, would also have the same effect. Hence, the application of a constant-buoyancy tax model to estimate tax buoyancy in developing economies such as Malaysia, would be inappropriate. Any policy prescriptions based on this might lead to inappropriate policy recommendations.

In order to measure tax buoyancy on an annual basis, this study utilized a flexible-form tax model introduced by Box-Cox (1964). This methodology, which has been applied by Greytak and Thursby (1979) to estimate the tax elasticity of the New York personal income tax, allows the data to discriminate among functional forms. Osoro and Leuthold (1994) also used this method to determine the elasticity of Tanzania's Tax System from 1969-90 and found that the elasticity changes over time.

BOX-COX TAX MODEL

This study will utilize a flexible-form tax model⁵ suggested by Box and Cox (1964) as shown below :

$$T_{it}(\lambda^{1i}) = \alpha_{0i} + \alpha_{1i} Y_t(\lambda^{2i}) + e_{it} \quad (1)$$

where $T_{it}(\lambda^{1i}) = (T_{it}(\lambda^{1i}) - 1) / \lambda_{1i}$ if $\lambda_{1i} \neq 0$

$$\begin{aligned}
 &= \ln T_{it} && \text{otherwise} \\
 \text{and} & && \\
 Y_t &= (Y_t^{\lambda_{2i}} - 1) / \lambda_{2i} && \text{if } \lambda_{2i} \neq 0 \\
 &= \ln Y_t && \text{otherwise.}
 \end{aligned}$$

T_{it} is the tax revenue from the i th tax in period t , λ is the transformation parameter, Y_t is the gross domestic product and e_{it} is the error term.

If the transformation parameter $\lambda_{1i} = \lambda_{2i} = 1$, then the model takes on the linear form:

$$T_{it} = \alpha_{0i} + \alpha_{1i} Y_t + e_{it} \tag{2}$$

while if $\lambda_{1i} = \lambda_{2i} = 0$, then the model takes on the double-log form;

$$\ln T_{it} = \alpha_{0i} + \alpha_{1i} \ln Y_t + e_{it} \tag{3}$$

Other values of λ 's will lead to alternative non-linear tax models.

The tax buoyancy for this model depends on the estimated coefficient α_{1i} and also on the estimated values of the transformation parameters λ_{1i} and λ_{2i} . It can be calculated as follows :

$$E_{it} = \alpha_{1i} T_{it}^{-\lambda_{1i}} Y_t^{\lambda_{2i}} \tag{4}$$

If the model turns out to be a double-log model, then the tax buoyancy will be constant over time. Otherwise, the buoyancy will take different values at different points in time.

BASIC RATIONAL FOR CHOICE OF DATA

This study utilized the tax receipts and GDP data from 1961-1998 which was obtained from 1961 to 1998 annual Economic Reports. In Malaysia, direct taxes are based on previous year's income/GDP while indirect taxes depends on current year income/GDP. These differences will affect the way the data are re-

gressed. In this paper GDP is used as a proxy to income. Direct taxes are regressed on lag GDP (Y_{t-1}) since its receipts are affected by previous year's GDP. Hence, the appropriate tax model for direct taxes is $T_{it}^{\lambda_{1i}} = \alpha_{0i} + \alpha_{1i} Y_{t-1}^{\lambda_{2i}} + e_{it}$. On the other hand, indirect taxes are regressed on current GDP (Y_t) by the same argument. Hence, the appropriate tax model for indirect taxes is $T_{it}^{\lambda_{1i}} = \alpha_{0i} + \alpha_{1i} Y_t^{\lambda_{2i}} + e_{it}$.

Commencing year 2000, income of a taxable person is assessed on a current year basis. For example, the basis year for year of assessment 2000 is 1 January 2000 to 31 December 2000. This is a marked change in tax policy as income earned prior to 1 January 2000 was assessed on a preceding year basis.

ESTIMATION OF TAX BUOYANCIES

In order to determine the intertemporal buoyancies of direct and indirect taxes, the following steps were taken.

First, Equation (1) was estimated using SHAZAM⁶ statistical package. Two sets of regressions were made; one by applying unconstrained transformation parameters (that is by letting the data to determine the values of λ_{1i} and λ_{2i}) and the other by using different constraints or restrictions on λ 's (that is by forcing $\lambda_{1i} = \lambda_{2i} = 0$, $\lambda_{1i} = \lambda_{2i} = 1$ and $\lambda_{1i} = \lambda_{2i} = \lambda$).⁷ The values of the maximized log-likelihood function obtained from both sets of regressions were then used in the likelihood ratio test⁸ (LR test) to reject $H_0 : \lambda$'s are equal. The likelihood ratio (LR), is calculated using the following formulae, $LR = 2(LLF_{UR} - LLF_R)$ and its value follows the χ^2_m distribution function. R indicates restricted while UR indicates unrestricted and m is the number of restrictions. The authors carried out the LR test by comparing the calculated value of χ^2_m with that of the critical value at five (5) percent significance level.⁹ The critical values for the χ^2 distribution were $\chi^2_{2,5\%} = 5.991$ for $\lambda_{1i} = \lambda_{2i} = 0$ and $\lambda_{1i} = \lambda_{2i} = 1$, and $\chi^2_{1,5\%} = 3.841$ for $\lambda_{1i} = \lambda_{2i} = \lambda$. Since the calculated values of χ^2 for $\lambda_{1i} = \lambda_{2i} = 0$ and $\lambda_{1i} = \lambda_{2i} = 1$ were more than 5.99 and the calculated value of χ^2 for $\lambda_{1i} = \lambda_{2i} = \lambda$ was more than 3.841, the

hypothesis that the λ 's are equal was therefore rejected. The above steps were then repeated for indirect taxes. Again, the hypothesis that the λ 's are equal in

the case of indirect taxes was also rejected. The results of the LR test are presented in Table 4.

Table 4
Restricted & Unrestricted Box-Cox Estimates of the Log-Likelihood Function

| Taxes | Restriction | LLF _R | LLF _{UR} | LR |
|----------|--|------------------|-------------------|---------|
| Direct | $\lambda_{1i}=\lambda_{2i}=0$ | -298.453 | -270.089 | 56.728 |
| | $\lambda_{1i}=\lambda_{2i}=1$ | -314.895 | | 89.612 |
| | $\lambda_{1i}=\lambda_{2i}=\lambda (0.370)$ | -289.544 | | 38.910 |
| Indirect | $\lambda_{1i}=\lambda_{2i}=0$ | -298.559 | -280.390 | 36.338 |
| | $\lambda_{1i}=\lambda_{2i}=1$ | -331.807 | | 102.834 |
| | $\lambda_{1i}=\lambda_{2i}=\lambda (-0.220)$ | -297.074 | | 33.368 |

Notes : LLF is the log-likelihood function. In order to determine whether the restrictions on lamdas are rejected or not, the likelihood ratio test needs to be applied.

Thus, the appropriate models for both taxes are flexible in nature with unconstrained transformation parameters, λ 's. The estimated coefficients (α_{0i} , α_{1i}) and transformation parameters (λ_{1i} , λ_{2i}) of equation (1) for both direct and indirect taxes are shown in Table 5. All coefficient values for both tax equations are significant at five percent level by normal t-test. The fit of the equations, measured by the adjusted R², were also found to be good. Once the estimated coefficients and transformation parameters were ascertained, the

next step involved the determination of the buoyancy values using equation (4). These results are presented in Table 6 and a graph is depicted in Figure 1.

Generally, the buoyancy values of direct taxes have gradually fallen from a peak of 2.0353 in 1961 to a low of 0.6927 in 1998. Likewise, the buoyancy values of indirect taxes too have fallen, albeit at a lower phase, from a high of 1.3279 in 1961 to an all-time low of 0.3955 in 1998. The general indications are that the tax system has become less efficient over the years.

Table 5
Box-Cox Estimates of the Regression Models

| Tax | α_{0i} | α_{1i} | λ_{1i} | λ_{2i} | LLF | Adj R ² |
|----------|---------------|---------------|----------------|----------------|----------|--------------------|
| Direct | -100.37 | 43.536 | -0.090 | -0.40411 | -270.089 | 0.9961 |
| | (-90.67) | (95.77) | | | | |
| Indirect | -53.130 | 39.876 | -0.460 | -0.72126 | -280.390 | 0.9944 |
| | (-77.11) | (80.19) | | | | |

Notes : The asymptotic t-statistics are shown in parenthesis. Adj R² is the adjusted R² and LLF is the log-likelihood function. The regression model is $T_{it}^{(\lambda^{1i})} = \alpha_{0i} + \alpha_{1i}Y_t^{(\lambda^{2i})} + e_{it}$.

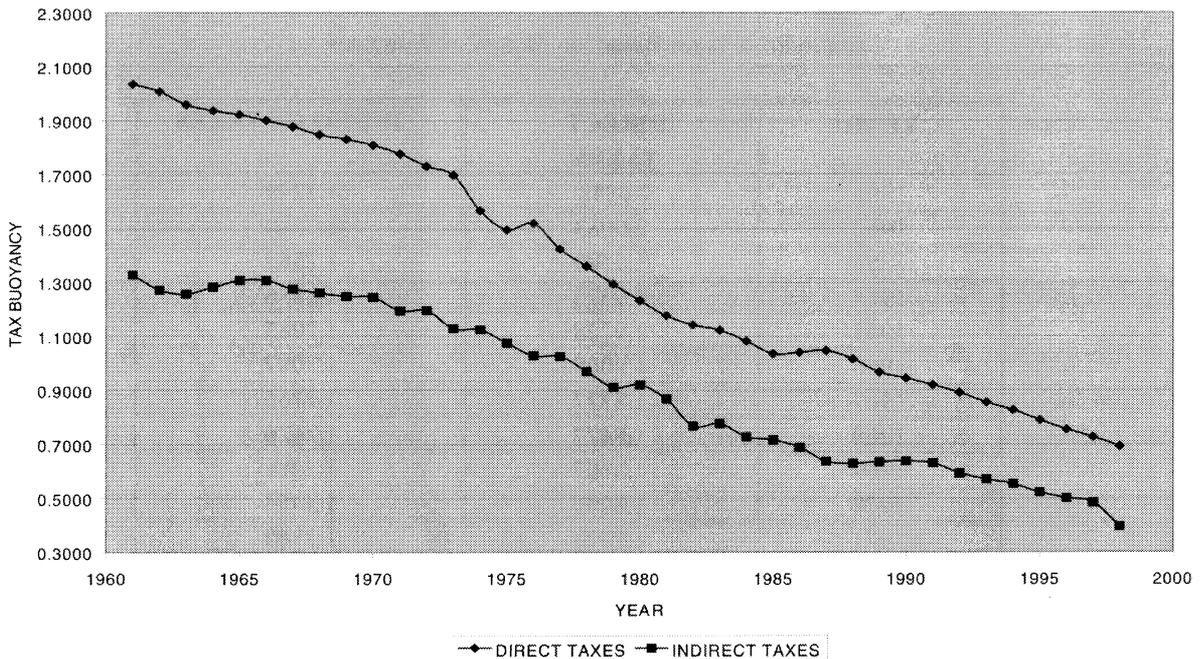
Table 6
 Intertemporal Tax Buoyancies of Malaysia's Direct
 and Indirect Taxes Based on Box- Cox Estimates

| YEAR | DIRECT TAXES | INDIRECT TAXES |
|------|--------------|----------------|
| 1961 | 2.0353 | 1.3279 |
| 1962 | 2.0083 | 1.2728 |
| 1963 | 1.9590 | 1.2583 |
| 1964 | 1.9373 | 1.2836 |
| 1965 | 1.9228 | 1.3085 |
| 1966 | 1.9008 | 1.3087 |
| 1967 | 1.8777 | 1.2765 |
| 1968 | 1.8477 | 1.2626 |
| 1969 | 1.8307 | 1.2486 |
| 1970 | 1.8090 | 1.2454 |
| 1971 | 1.7771 | 1.1945 |
| 1972 | 1.7310 | 1.1968 |
| 1973 | 1.6983 | 1.1297 |
| 1974 | 1.5669 | 1.1253 |
| 1975 | 1.4956 | 1.0750 |
| 1976 | 1.5193 | 1.0284 |
| 1977 | 1.4237 | 1.0258 |
| 1978 | 1.3594 | 0.9703 |
| 1979 | 1.2933 | 0.9113 |
| 1980 | 1.2324 | 0.9203 |
| 1981 | 1.1771 | 0.8679 |
| 1982 | 1.1420 | 0.7678 |
| 1983 | 1.1231 | 0.7768 |
| 1984 | 1.0825 | 0.7281 |
| 1985 | 1.0362 | 0.7167 |
| 1986 | 1.0410 | 0.6886 |
| 1987 | 1.0469 | 0.6367 |
| 1988 | 1.0165 | 0.6292 |
| 1989 | 0.9669 | 0.6349 |
| 1990 | 0.9448 | 0.6381 |
| 1991 | 0.9198 | 0.6303 |
| 1992 | 0.8912 | 0.5920 |
| 1993 | 0.8549 | 0.5700 |
| 1994 | 0.8272 | 0.5530 |
| 1995 | 0.7897 | 0.5215 |
| 1996 | 0.7553 | 0.5014 |
| 1997 | 0.7267 | 0.4844 |
| 1998 | 0.6927 | 0.3955 |

Note : Tax buoyancies are calculated using the following

$$\text{formulae : } E_{it} = \alpha_{ii} T_{it}^{-(\lambda_{1i})} Y_t^{(\lambda_{2i})}$$

FIGURE 1
Intertemporal Tax Buoyancies of Malaysia's Tax System



Generally, the buoyancy values of direct taxes have gradually fallen from a peak of 2.0353 in 1961 to a low of 0.6927 in 1998. Likewise, the buoyancy values of indirect taxes too have fallen, albeit at a lower phase, from a high of 1.3279 in 1961 to an all-time low of 0.3955 in 1998. The general indications are that the tax system has become less efficient over the years.

INTERPRETATION OF RESULTS

The declining buoyancies of both direct and indirect taxes are consistent with previous studies done on Malaysia's tax system. This is partly due to the government's fiscal policies over the years and also because of existing tax structures and administrative system. In addition to raising revenue to finance government expenditure, the existing tax structure regulates the activities of specific areas of the private sector so as to encourage activities that are beneficial to the country and to discourage those that are undesirable to the national interest.

Revenue from direct taxes mainly comes from corporate, individual and petroleum income taxes. In

fact, these taxes accounted for more than 87 percent of revenue generated by direct taxes in 1998 (see Table 1). There has been a gradual decline in both individual and corporate tax rates over the last two decades. Prior to 1985, the tax rates for resident individuals ranged from six percent to 55 percent. Supplementary taxes like development tax and excess profits tax were five percent. This raised the marginal tax rate for some individuals to 65 percent. A significant change in the personal income tax structure took place in 1985. The graduated rates were reduced substantially from 55 percent to 40 percent for the year 1985. The income tax rates were further revised in 1991: ranging from four percent to 35 percent and in 1993 from two percent to 34 percent. Supplementary taxes were completely abolished by 1993. This downward trend has continued progressively. From 1996, the income tax rates on individuals have been further reduced to range from zero percent to 30 percent.

In like manner, corporate income tax was reduced from a high rate of 40 percent in 1984 to 35 percent in 1989; to 34 percent in 1993; to 32 percent in 1994 and 30 percent as from 1995. Supplementary

taxes such as the development tax imposed on business income which were gradually phased out, were finally abolished in 1993. The current maximum marginal tax rates on individual and corporate income taxes are 30 percent and 28 percent respectively. This trend is not expected to be reversed in the near distant future, in line with government objectives to revitalize the private sector as the engine of growth and making corporate investment in the country more attractive.

The current petroleum income tax rate is 38 percent. Its contribution as a percentage of direct taxes has declined over the years from 1991 to 1999 but rebounded strongly in 2000 as global petroleum prices increased during the year. The severe fluctuation is inevitable as petroleum prices are governed by world market forces and crude oil production. The most significant development after the 1991 Gulf War was the decline in the price of crude oil. The weighted average of Tapis blend was USD20 per barrel in 1996 and USD14.8 per barrel in 1998 compared to USD40 per barrel at the height of the Gulf crisis. Since petroleum is a depletable resource, its revenue generation is also expected to decline in future years. This trend in taxation has shown a pattern of reducing direct taxation. By the year 2020, it is anticipated that the individual tax rates could be reduced even further to range perhaps from zero percent to 22 percent. Corporate income tax, too, could be lowered to possibly 20 percent (Kasipillai and Shanmugam, 1997).

A much lower tax buoyancy of indirect taxes, particularly in the latter years, is indicative of its relative lower efficiency in generating revenue. As mentioned earlier, indirect taxes comprise customs duties, excise duties, sales tax and service tax. Both sales tax and service tax have a narrow tax base and there are ample loop-holes in the overall tax structure. Export taxes are mainly from exportation of petroleum, rubber, palm oil, pepper and tin. Revenue from these commodities have declined over the years due to weak and unstable prices. Import duties too have been declining since 1970. For instance, import duties on numerous items have either been reduced or abolished

during the last couple of years. This trend is expected to continue as Malaysia is a signatory to the World Trade Organization (WTO). In 1997 and 1998, the government discouraged imports as a result of the economic crisis and this move resulted in a decline in revenue from this source.

The narrow base of sales and service taxes and excise duties and the continued use of specific rather than *ad valorem* rates on major revenue-producing items have all contributed to the marked reduction in the buoyancy estimates of indirect taxes.

CONCLUSION

Studies on tax buoyancies for Malaysia had consistently shown declining estimates for both direct and indirect taxes. This study also confirmed previous findings of declining buoyancy estimates for the period 1961 to 1998. The study, however, differs from previous studies in that it provides buoyancy estimates for each year. Future research on buoyancy estimates of Malaysia's tax system should include the post-economic crisis years, including 1999 and 2000.

Since tax buoyancy measures revenue productivity of a tax system, declining buoyancy estimates suggest that the current Malaysian tax system is inefficient in generating adequate revenue for the country. A declining tax revenue would hinder economic development that requires government support through adequate public spending, which in turn might jeopardize Malaysia's vision to become a developed nation by the year 2020. It is, therefore, recommended that the existing tax system be revamped with greater emphasis towards a consumption-based tax system. A consumption based tax is a form of indirect tax.

There are strong grounds for integrating some existing indirect taxes, particularly sales and service tax, into a single broad-based consumption tax-referred to as Value-Added Tax (VAT). The advantages of VAT includes economic neutrality, encouragement of sav-

ings and capital formation, a stable source of revenue, the ability to raise large amounts of revenue at relatively low rates, and the relative ease of administration. However, the exact manner this consumption-based tax will be imposed would very much depend on the aim, political will and administrative capabilities peculiar to Malaysia.

ENDNOTES

1. See Bardai (1993) for more details.
2. Other miscellaneous indirect taxes include levy on goods vehicles leaving the country.
3. Estimated as $\ln y = a + b \ln x$, where y is tax revenue and x is GDP.
4. $E = (dT/T)/(dY/Y) = (dT/dY)/(T/Y) = MTR/ATR$.
5. For a brief explanation on the Box-Cox transformation, see Pindyck & Rubinfeld (1991) pp 555-564.
6. The SHAZAM Statistical Application Package version 7.0 was employed to conduct all specification tests (White, 1993).
7. The value of λ chosen here is that of the one that maximized the log likelihood function.
8. See Pindyck & Rubinfeld (1991), pp 238-242 for a detailed explanation.
9. If LR is greater than $\chi^2_{2, 5\%}$ for $\lambda_{11} = \lambda_{21} = 0$ and $\lambda_{11} = \lambda_{21} = 1$, and if LR is greater than $\chi^2_{1, 5\%}$ for $\lambda_{11} = \lambda_{21} = \lambda$ then reject the restrictions. Otherwise do not reject H_0 .

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